

## ABSTRACT OF THE DISCLOSURE

59 A detector apparatus and its use for cluster ion beam diagnostics are described. The detector has a Faraday cup with a conductance path to a gas pressure detector and a conductance to the detector exit. The detector acquires ion current, which is a measure of the ion beam flux, and also acquires mass flux, through a pressure measurement. The pressure measurement responds to the mass of dissociated gas clusters and is combined with information about instantaneous ion current to estimate mean gas cluster ion size ( $\bar{N}_i$ ).

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